

IN THE CLAIMS

1. (original) An oral vaccine comprising a recombinant lactic acid bacterium capable of expressing a heterologous antigen intracellularly and/or on the surface of the bacterium, wherein the bacterium is *Lactobacillus plantarum* and can elicit an immune response and/or immunogenicity against the heterologous antigen.
2. (original) A vaccine according to claim 1 wherein the recombinant *Lactobacillus plantarum* comprises an expression vector capable of causing expression of the heterologous antigen intracellularly and/or exposure on the cell surface, optionally under conditions present in the gastrointestinal tract.
3. (previously presented) A vaccine according to claim 1 wherein the heterologous antigen can induce immunogenicity against a pathogenic microorganism, optionally a heterologous antigen specific for a mucosa colonising pathogen or pathogen entering the body via the mucosa, such as via the oral route.
4. (previously presented) A vaccine according to claim 1 wherein the heterologous antigen induces immunogenicity against a pathogenic microorganism colonising the gastrointestinal tract.
5. (currently amended) A vaccine according to claim 1 wherein the pathogenic microorganism is herpes virus, rubella virus, influenza virus, mumps virus, measles virus, poliomyelitis ~~Virus~~virus, rotavirus, respiratory syncytial virus, *Campylobacter* species, ~~Chiamydia~~Chlamydia organisms, species of the genus *Cryptosporidium*, cytomegalovirus, human immunodeficiency virus, *Actinomyces* species, *Entamoeba histolytica*, arenaviruses, arboviruses, *Clostridium botulinum*, species of the genus *Candida*, *Vibrio cholera*, *Cryptococcus neoformans*, EHEC strains of *E. coli* O157:H7, O26:H11, O111:H8 and O104:H21, ETEC strains of *E. coli*, strains of *E. coli* shown to possess enteroinvasiveness (EIEC), EPEC strains of *E. coli* EAaggEC strains of

E._coli[[.]], DAEC strains of *E._coli*, filoviridae, parvovirus, *Filarioidea*, *Staphylococcus aureus*, species of the genus *Clostridium perfringens*, *Helicobacter pylori*, Caliciviruses, *Giardia lamblia*, *Neisseria gonorrhoeae*, hantaviruses, hepatitis ~~viruses~~virus types A, B, C, D, and E, *Legionellae* strains, *Mycobacterium leprae*, *Listeria monocytogenes*, species of the genus *Clostridium perfringens*, *Borrelia burgdorferi*, *Pseudomonas pseudomallei*, Epstein Barr virus, *Onchocerca volvulus*, Poxvirus, *Bordetella pertussis*, *Yersinia pestis*, *Coxiella burnetti*, rabies virus, *Treponema pallidum*, *Mycobacterium tuberculosis*, *Salmonella typhi*, a (~~eukaryotic-parasite~~)eukaryotic parasite causing malaria, ~~*pneumocystis*~~*Pneumocystis pneumonia*, an agent causing toxoplasmosis, or any combination thereof.

6. (currently amended) A vaccine according to claim 1 which elicits a protective response against a rotavirus, respiratory syncytial virus, *Mycobacterium tuberculosis*, human immunodeficiency virus, *E._coli*, *Vibrio cholera*, streptococci and/or chlamydia.

7. (currently amended) A vaccine according to claim 1 wherein the heterologous antigen is a viral and/or bacterial antigen optionally a (~~gp-160~~)gp160 envelope protein of the HIV virus, a surface glycoprotein of a *Leishmania* parasite, Shiga-like toxin, *Shigella* lipopolysaccharide antigen, *Escherichia coli* fimbrial antigen, a CFA antigen of an enterotoxigenic *Escherichia coli* strain, anthrax toxin, pertussis toxin, or tetanus toxin.

8. (previously presented) A vaccine according to claim 1 wherein the heterologous antigen is a human allergen or the heterologous antigen is specific for tetanus.

9. (previously presented) A vaccine according to claim 1 which can induce protective immunogenicity.

10. (previously presented) A vaccine according to claim 1 formulated as a single dose vaccine.

11. (currently amended) A vaccine according to claim 1 wherein the recombinant *Lactobacillus plantarum* expresses the heterologous antigen intracellularly and/or on the cell surface to a degree exceeding that of *Lactobacillus plantarum* 80 expressing β -galactosidase.
12. (currently amended) A vaccine according to claim 1 wherein the recombinant *Lactobacillus plantarum* comprises a homologous expression and/or secretion signal, optionally in an expression vector for *Lactobacilli*, preferably for *Lactobacillus plantarum*.
13. (currently amended) A vaccine according to claim 1 wherein the recombinant *Lactobacillus plantarum* strain exhibits a ~~persistance~~ persistence (in the individual vaccinated) persistence in a vaccinated individual exceeding 5 days, preferably exceeding 9 days, suitably more than 15 or even 20 days.
14. (currently amended) A vaccine according to claim 1 wherein the recombinant *Lactobacillus plantarum* exhibits a ~~persistance~~ persistence longer than that of *L. plantarum* 80, preferably longer than that of *L. plantarum* NCIMB 8826, under equivalent conditions.
15. (currently amended) A vaccine according to claim 1 formulated for administration to a human, such as an infant, immunocompromised person, elderly person or a normally healthy infant, child or adult.
16. (previously presented) A vaccine according to claim 1 wherein the recombinant *Lactobacillus plantarum* is a recombinant *Lactobacillus plantarum* 256.
17. (previously presented) A vaccine according to claim 1 wherein the vaccine comprises at least one adjuvant or a pharmacologically acceptable carrier.

18. (previously presented) A recombinant *Lactobacillus plantarum*, optionally a recombinant strain of *Lactobacillus plantarum* 256, as defined in vaccine claim 1.

19. (original) A bacterium according to claim 18 which is of non-human origin.

20. (original) A non-human and/or non-human foodstuff *Lactobacillus* bacterium which has been modified to express a heterologous antigen and to elicit an immune response in an individual.

21. (currently amended) A bacterium according to claim 20 wherein:

- (a) the naturally occurring or unmodified *L. plantarum* is foreign to that individual or is not present in the ~~G-I~~gastrointestinal tract or mucosa of humans;
- (b) the antigen is expressed intracellularly and/or on the cell surface; and/or
- (c) the antigen is an immunogen.

22. (original) A *Lactobacillus* bacterium which has been modified to express a heterologous antigen intracellularly and/or on the cell surface, to elicit an immune response to an individual and which can persist in the gastrointestinal tract of that individual for at least 7 days.

23. (previously presented) A *Lactobacillus* organism according to claim 18 which is *L. plantarum* or is for use in a vaccine.

24. (original) An expression vector suitable for intracellular expression or exposure (on a cell surface) of a heterologous antigen, the expression vector being capable of providing expression in a *Lactobacillus plantarum* of the heterologous antigen under conditions existing in the gastrointestinal tract.

25. (previously presented) A bacterium according to claim 19 for use in a method of prophylaxis or treatment of the human or animal body.

26. (original) The use of a *Lactobacillus* bacterium which has been modified to express a heterologous antigen intracellularly and/or on the cell surface for the manufacture of a vaccine for an individual for whom the unmodified *L. plantarum* is foreign.

27. (currently amended) The use according to claim 26 wherein the unmodified *Lactobacillus* is *L. plantarum*, is not found in humans (the strain is endogenous) or is not present in the ~~G-I~~gastrointestinal tract or mucosa of mammals.

28. (previously presented) The use of a bacterium according to claim 19 in the manufacture of a vaccine.

29. (original) The use according to claim 28 wherein the vaccine is adapted for oral administration and/or elicits an immune response on administration.

30. (previously presented) The use according to claim 26 for treating or preventing tetanus.